Center Innovation Fund: JPL CIF

Long-life High-Isp Hall Thruster Technology With Auxiliary Gas Injection

Completed Technology Project (2017 - 2018)

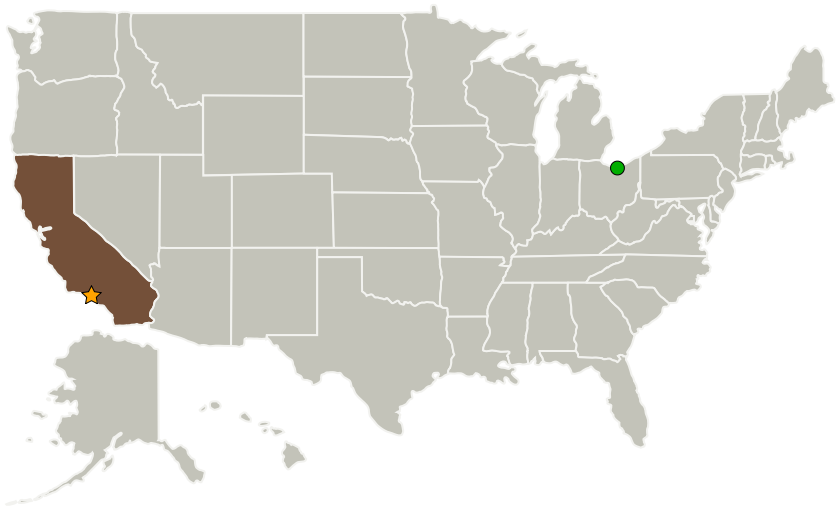
Project Introduction

To design and test an auxiliary gas injection technique that reduces discharge oscillations and enables longer lifetimes for Hall Thrusters operating at high Isp.

Anticipated Benefits

Lower 1/f noise will allow long integration times or frame averaging. This will improve the sensitivity (i.e., signal-to-noise ratio) of the instrument. The increase of VLWIR detector operating temperatures will reduce the size, weight and power (SWaP) of infrared imagers and spectrometers. This will broaden the application areas of these instruments, in particular for low cost CubeSats/SmallSat for Earth and planetary science missions.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
●Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Long-life High-Isp Hall Thruster Technology With Auxiliary Gas Injection

Table of Contents

Long-life High-Isp Hall Thruster Technology With Auxiliary Gas Injection

Completed Technology Project (2017 - 2018)

Primary U.S. Work Locations
California

Project Transitions

October 2017: Project Start

September 2018: Closed out

Closeout Summary: In FY18, JPL's physics-based models have been improved to reproduce the breathing mode oscillations commonly observed in Hall thrusters and have demonstrated that the dominant oscillations at Isp>2500 s are a different global mode never before characterized. Future work will be required to understand the new oscillation mode to guide changes in thruster design or operating parameters to enable high Isp operation.

Project Website:

https://www.nasa.gov/directorates/spacetech/innovation_fund/index.html#.VC

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

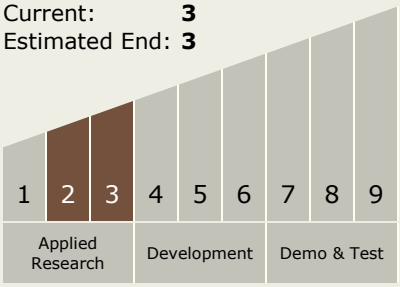
Fred Y Hadaegh

Principal Investigator:

Vernon H Chaplin

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Long-life High-Isp Hall Thruster Technology With Auxiliary Gas Injection

Completed Technology Project (2017 - 2018)

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic

Target Destinations

Mars, Others Inside the Solar System